* NOTICES *

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2. **** shows the word which can not be translated.
3. In the drawings, any words are not translated.

CLAIMS

[Claim(s)]
[Claim 1] A disk installation means to have the tray of two or more sheets on which the disk of two or more sheets is laid, A rotation means to rotate a motor as a rotation driving source, and the disk drawing means which drives for the above-mentioned rotation means and removes the disk of one sheet from the above-mentioned disk installation means, The turntable support means which drives for the above-mentioned rotation means and is rotated, Disk changer equipment which comes to provide a disk guide means to pinch the disk which drove for the above-mentioned rotation means and was removed from the above-mentioned disk drawing means, and to transport a disk to the turntable of the above-mentioned turntable support means.
[Claim 2] Disk changer equipment according to claim 1 which comes to provide a spiral cam means to drive for a rotation means and to rotate, and a tray straddle means to make between the predetermined trays to which the laminating of the plurality was carried out by the above-mentioned cam means straddle.
[Claim 3] Disk changer equipment according to claim 2 characterized by inserting a turntable support means between the trays which straddled with the tray straddle means, clamping a disk on the turntable of this turntable support means, and performing disk playback.
[Claim 4] Disk changer equipment [come / in a lock means constitutes a turntable support means from a rotation substrate supported rotatable and an optical pickup chassis held through the absorber at the above-mentioned rotation substrate, makes the function of the above-mentioned absorber impossible, and fix the above-mentioned optical pickup chassis to the above-mentioned rotation substrate mechanically, and a lock control means / cancel / lock or / the above-mentioned lock means / drive to the above-mentioned rotation means, and / lock / to provide] according to claim 1.
[Claim 5] Disk changer equipment according to claim 1 which comes to provide a means to carry out opposite arrangement of the 1st and 2nd disk regulation means which can insert the feed hole of the disk contained by the disk installation means, to drive for a rotation means, and to make the disk regulation means of the above 1st approach and desert the disk regulation means of the above 2nd.
[Claim 6] Disk changer equipment according to claim 1 which comes to provide a disk insertion opening closing motion means to form a slot in a part of outside periphery section of the body of revolution by which a rotation drive is carried out with a rotation means, to contact a part of lever supported to revolve by the fixed part in the outside periphery section of the above-mentioned body of revolution, and to open and close disk insertion opening by vertical movement of

the above-mentioned lever.
[Claim 7] While establishing a sliding means to drive for a rotation means and to slide and rotating a spiral cam means with sliding actuation of this sliding means The 1st which can insert the feed hole of the disk contained by the disk installation means, and a means to carry out opposite arrangement of the 2nd disk regulation means, to follow on sliding actuation of the above-mentioned sliding means, and to make the disk regulation means of the above 1st approach and desert the disk regulation means of the above 2nd are provided. Becoming disk changer equipment according to claim 2.
[Claim 8] Disk changer equipment according to claim 7 which comes to constitute the 1st disk regulation means from a cylinder object with which the gearing with which the spiral slot was formed in the periphery section, and the pin inserted in inner skin in the above-mentioned gearing's slot were formed while having the gearing section which gears to the tooth part of a sliding means.
[Claim 9] Disk changer equipment according to claim 1 which comes to provide a spring means to accumulate the tray of two or more sheets held possible [vertical movement], and the tray of two or more above-mentioned sheets, and an elevator means to move up and down the disk installation means unified by the above-mentioned spring means.
[Claim 10] Disk changer equipment according to claim 9 which comes to constitute an elevator means to rotate the cam gear in which the spiral slot which engages with the periphery section of a tray was formed, and to move a disk installation means up and down.
[Claim 11] A disk installation means to have the tray of two or more sheets on which the disk of two or more sheets is laid, A rotation means to rotate a motor as a rotation driving source, and the disk drawing means which drives for the above-mentioned rotation means and removes the disk of one sheet from the above-mentioned disk installation means, The lever which it is pressed with the disk extruded by this disk drawing means, and is rotated, Disk changer equipment characterized by providing a disk detection means to detect rotation of this lever, and detecting the existence of the disk on the tray of the above-mentioned disk installation means with the above-mentioned disk detection means.
[Claim 12] Disk changer equipment according to claim 1 with which a turntable support means comes to support an optical pickup possible [sliding].
[Claim 13] Disk changer equipment according to claim 1 which comes to constitute a disk guide means from the 1st and 2nd disk maintenance means supported by the support substrate free [vertical sliding] and a cam plate with which the 1st and 2nd cam groove by which it is supported by the above-mentioned support substrate possible [sliding of a longitudinal direction], and the pin of the above 1st and the 2nd disk maintenance means is inserted in it was formed.

[Translation done.]

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] This invention relates to the disk changer equipment which plays disks, such as a compact disk (CD), alternatively.
[0002]
[Description of the Prior Art] Drawing 31 shows the important section of conventional disk changer equipment. In drawing 31 , 90 is the case of a cube type and disk insertion opening is formed in front-board 90A of this case 90. 91 is a roller arranged near the disk insertion opening in a case 90, and the disk 92 inserted from disk insertion opening is transported into a case 90 with the roller 91 driven by the motor, and is laid in the tray in a case 90. The disk 92 of one sheet of the disks laid in two or more trays is extruded in the center of a case 90 according to a disk drawing device, and is fixed to a turntable 93. The above-mentioned turntable 93 is held free [the rotation to the point of the rotation plate 95 supported by the bottom face-plate of a case 90 rotatable with the shaft 94]. A motor is attached in the above-mentioned rotation plate 95, and a turntable 93 rotates with the driving force of this motor. The optical pickup 96 is formed in the above-mentioned rotation plate 95, and the information recorded on the disk 92 by which the rotation drive was carried out is read by the above-mentioned optical pickup 96.
[0003]
[Problem(s) to be Solved by the Invention] As compared with the disk changer equipment of the above-mentioned conventional overlap playback, it can miniaturize more, and this invention aims at offering the disk changer equipment which can ensure disk-swapping and disk playback.
[0004]
[Means for Solving the Problem] In order that this invention may solve the above-mentioned conventional trouble, migration actuation of a disk, disk playback actuation, etc. become certain by performing actuation of a disk drawing means, rotation of a turntable support means, the disk guide by the disk guide means, etc. synchronously with a rotation means to rotate a motor as a rotation driving source.

[0005]
[Embodiment of the Invention] A disk installation means by which invention of this invention according to claim 1 has the tray of two or more sheets on which the disk of two or more sheets is laid, A rotation means to rotate a motor as a rotation driving source, and the disk drawing means which drives for the above-mentioned rotation means and removes the disk of one sheet from the above-mentioned disk installation means, The turntable support means which drives for the above-mentioned rotation means and is rotated, It is what is characterized by providing a disk guide means to pinch the disk which drove for the above-mentioned rotation means and was removed from the above-mentioned disk drawing means, and to transport a disk to the turntable of the above-mentioned turntable support means. Since rotation actuation of a disk drawing means and a turntable support means and a disk guide means are operated synchronizing with a rotation means, the timing of each actuation becomes fixed and disk drawing actuation, rotation actuation of a

turntable support means, and guide actuation of a disk can be ensured. Invention of this invention according to claim 2 is characterized by providing a spiral cam means to drive for a rotation means and to rotate, and a tray straddle means to make between the predetermined trays to which the laminating of the plurality was carried out by the above-mentioned cam means straddle, and a tray straddle means becomes easy.

[0006] Since invention of this invention according to claim 3 inserts a turntable support means between the trays which straddled with the tray straddle means, is characterized by clamping a disk on the turntable of this turntable support means, and performing disk playback, inserts a turntable between the trays which straddled and performs disk playback, it can miniaturize disk changer equipment.

[0007] The rotation substrate with which invention of this invention according to claim 4 was supported rotatable, A lock means to constitute a turntable support means from an optical pickup chassis held through the absorber at the above-mentioned rotation substrate, to make the function of the above-mentioned absorber impossible, and to fix the above-mentioned optical pickup chassis to the above-mentioned rotation substrate mechanically, Since it is characterized by providing the lock control means which drives for a rotation means, and locks or cancels [lock] the above-mentioned lock means and the lock control means is provided, At the time of disk playback, an absorber can remove the effect by extraneous vibration, and stationing of a turntable becomes exact except the time of disk playback.

[0008] Invention of this invention according to claim 5 carries out opposite arrangement of the 1st and 2nd disk regulation means which can insert the feed hole of the disk contained by the disk installation means. It is characterized by providing a means to drive for a rotation means and to make the disk regulation means of the above 1st approach and desert the disk regulation means of the above 2nd, and since migration of disks other than the disk played is regulated, playback actuation becomes certain.

[0009] Invention of this invention according to claim 6 forms a slot in a part of outside periphery section of the body of revolution by which a rotation drive is carried out with a rotation means, contacts a part of lever supported to revolve by the fixed part in the outside periphery section of the above-mentioned body of revolution, and is characterized by to provide a disk insertion opening closing-motion means open and close disk insertion opening by vertical movement of the above-mentioned lever, and the device which opens and closes disk insertion opening becomes easy.

[0010] While invention of this invention according to claim 7 establishes a sliding means to drive for a rotation means and to slide and rotating a spiral cam means with sliding actuation of this sliding means They are the 1st which can insert the feed hole of the disk contained by the disk installation means, and the thing which carries out opposite arrangement of the 2nd disk regulation means, and is carried out [having provided a means to have followed on sliding actuation of the above-mentioned sliding means, and to make the disk regulation means of the above 1st approach and desert the disk regulation means of the above 2nd, and] as the description. Since a disk regulation means can be operated with a rotation means, the drive of a disk regulation means becomes easy.

[0011] While invention of this invention according to claim 8 has the gearing section which gears to the tooth part of a sliding means, it is characterized by

constituting the 1st disk regulation means from a cylinder object with which the gearing with which the spiral slot was formed in the periphery section, and the pin inserted in inner skin in the above-mentioned gearing's slot were formed, and the configuration of a disk regulation means becomes easy.

[0012] Invention of this invention according to claim 9 is characterized by providing a spring means to accumulate the tray of two or more sheets held possible [vertical movement], and the tray of two or more above-mentioned sheets, and an elevator means to move up and down the disk installation means unified by the above-mentioned spring means, and the configuration of an elevator means becomes easy.

[0013] Invention of this invention according to claim 10 is characterized by constituting an elevator means to rotate the cam gear in which the spiral slot which engages with the periphery section of a tray was formed, and to move a disk installation means up and down, and the elevator style to which a tray is moved becomes easy.

[0014] A disk installation means by which invention of this invention according to claim 11 has the tray of two or more sheets on which the disk of two or more sheets is laid, A rotation means to rotate a motor as a rotation driving source, and the disk drawing means which drives for the above-mentioned rotation means and removes the disk of one sheet from the above-mentioned disk installation means, The lever rotated with the disk extruded by this disk drawing means, A disk detection means to detect rotation of this lever is provided, it is characterized by detecting the existence of the disk on the tray of the above-mentioned disk installation means with the above-mentioned disk detection means, and the existence of the disk on a tray can be detected easily.

[0015] Invention of this invention according to claim 12 can be characterized by supporting an optical pickup possible [sliding] to a turntable support means, can insert a turntable support means between the trays which straddled, and can perform disk playback.

[0016] The 1st and the 2nd disk maintenance means which invention of this invention according to claim 13 was supported by the support substrate free [vertical sliding], It is what is characterized by constituting a disk guide means from a cam plate with which the 1st and 2nd cam groove by which it is supported by the above-mentioned support substrate possible [sliding of a longitudinal direction], and the pin of the above 1st and the 2nd disk maintenance means is inserted in it was formed. The disk guide device in which a disk is guided becomes easy.

Hereafter, the gestalt of operation of this invention is explained using drawing 30 from drawing 1 . The disk changer equipment of the following operation gestalten 1 is the example of the disk changer equipment for mount used installing in an automatic in the car one.

[0017] (Gestalt 1 of operation) In drawing 1 - drawing 5 , 1 is the case of a cube type and disk insertion opening is formed in front-board 1A of this case 1. 2 is a roller for disk loading arranged near the above-mentioned disk insertion opening in a case 1, and this roller 2 rotates with the roller drive (not shown) which makes a motor a rotation driving source, and performs insertion of a disk 3 and discharge. 4 is a semicircle annular tray holding a disk 3, and laminating arrangement of the tray 4 of two or more sheets is carried out at the corner section side of tooth-back plate 1B in a case 1, and right lateral plate 1C. The protruding line is formed in the top face of the edge facing the edge facing tooth-back plate 1B of

the outside of the above-mentioned tray 4, and right lateral plate 1C. When the laminating of the above-mentioned tray 4 is carried out, the space for height of the above-mentioned protruding line is formed, and a disk 3 is contained by this space part. A metal plate 5 is arranged at the maximum top-face [of the trays 4 of two or more above-mentioned sheets], and lowest side side, respectively, and the hole is formed in the above-mentioned tray 4 and the metal plate 5 at three places. Since three tray guide shafts with which both ends were fixed to the top-face plate and bottom face-plate of a case 1 are inserted in the hole of a tray 4 and a metal plate 5, two or more trays 4 and a metal plate 5 are guided at three above-mentioned tray guide shafts, and are movable up and down. 6 is the lever supported rotatable in the case 1, and the roller 7 is held at the tip of this lever 6. The above-mentioned lever 6 is energized clockwise (drawing 1) with the spring (not shown). The disk 3 inserted from disk insertion opening formed in the center of front-board 1A of a case 1 is transported with the roller 2 for disk loading, and is transported into the case 1 toward tooth-back plate 1B. Since the roller 7 at the tip of a lever 6 contacts the peripheral face of a disk 3 in the middle of this migration, the course is changed in the tray 4 direction and a disk 3 is contained by the tray 4.

[0018] Drawing 3 - drawing 5 shows the elevator style of the tray of the gestalt 1 of operation. In drawing 3 - drawing 5 , 8 is a coil spring, the lower limit of this coil spring 8 is stopped by the metal plate 5 arranged at the bottom, and the upper limit of a coil spring 8 is stopped by the metal plate 5 arranged at the topmost part. It is energized and piles up so that it may be inserted with the up-and-down metal plate 5, as the elastic force of this coil spring 8 shows two or more above-mentioned trays 4 to drawing 3 and drawing 14 . 9 is the 1st cam gear supported pivotable in the case 1, and as shown in drawing 7 , spiral cam-groove 9A in which the protruding piece formed in the center section of the periphery section of a tray 4 and a metal plate 5 is inserted is formed in this 1st cam gear 9. some spiral Yamabe of the cam gear 9 of the above 1st -- the width of face of 9B is formed more thickly than the width of face of other Yamabe 9C. 10 is the protruding piece formed in Yamabe 9B at one. The 2nd and 3rd cam gear 11 and 12 is similarly supported pivotable in the case 1. The cam groove in which the projection to which the this 2nd and 3rd cam gear 11 and 12 was formed in the edge of the periphery section of a tray 4 and a metal plate 5 is inserted is formed, and a part of width of face of Yamabe of the 2nd and 3rd cam gear 11 and 12 is formed more thickly than other Yamabe's width of face. The above 2nd and the 3rd cam gear synchronize and rotate the 1st cam gear 9 with the rotation driving force of a motor (motor 26 of drawing 6). Moreover, near the above 2nd and the 3rd cam gear 11 and 12, the 4th [which has Yamabe of still bigger width of face than the width of face of Yamabe of the this 2nd and 3rd cam gear 11 and 12], and 5th cam gear 13 and 14 is supported rotatable. If the cam gears 9, 11, and 12 rotate a motor 26 with the drive made into a rotation driving source, while between trays 4 will carry out sequential straddle with this rotation, if the 4th and 5th cam gear 13 and 14 rotates a motor 30 (motor 30 of drawing 18) with the drive made into a rotation driving source, as between trays 4 shows drawing 4 and drawing 15, it will straddle still more greatly.

[0019] Drawing 6 shows the device which carries out the rotation drive of the above 1st, 2nd, and 3rd cam gear 9, 11, and 12. The motor for elevators by which 26 was attached in the bottom plate of a case 1 in drawing 6 , The above 1st by which 9,

11, and 12 were supported free [rotation between the bottom plate of a case 1, and a top-face plate], the 2nd, the 3rd cam gear, The worm wheel with which 27 was attached in the revolving shaft of a motor 26, G1 and G2, G3, and G4, G5, G6, G7 and G8 are the gearings supported free [the rotation to the bottom plate of a case 1], and the rotation driving force of a motor 26 minds the above-mentioned gearings G1-G8. It is told to the above 1st, 2nd, and 3rd cam gear 9, 11, and 12, and the 1st, 2nd, and 3rd cam gear 9, 11, and 12 is rotated. Namely, the rotation driving force of a motor 26 is told to the 1st cam gear 9 through the worm wheel 27 -> gearing G4 -> gearing G5 -> gearing G6, and this 1st cam gear 9 is rotated. The rotation driving force of a motor 26 is told to the 3rd cam gear 12 through the worm wheel 27 -> gearing G3-> gearing G2 -> gearing G1, and this 3rd cam gear 12 is rotated. The rotation driving force of a motor 26 is told to the 2nd cam gear 11 through worm wheel 27 -> gearing G4 -> gearing G5 -> gearing G7 ->G8, and rotates this 2nd cam gear 11. Drawing 8 shows the 2nd and 3rd cam gear 11 and 12. The gearing sections 11A and 12A which gear with the above-mentioned gearings G8 and G1 are formed in the lower limit of the 2nd and 3rd cam gear 11 and 12, and the spiral cams 11B and 12B are formed in the upper part of the 2nd and 3rd cam gear 11 and 12 at one. Drawing 9 is drawing which developed the cylinder-like cam gears 11 and 12 to the plane, and projection 4A formed in the field of the spiral cams 11B and 12B at one at the periphery of a tray 4 contacts. When the cam gears 11 and 12 rotate, as shown in drawing 9 , projection 4A is the upper part or the thing driven caudad by Cams 11B and 12B. Drawing 10 shows the 4th and 5th cam gear 13 and 14. In drawing 10 , the gearing section by which 13A and 14A were formed in the lower part of the cam gears 13 and 14, and 13B and 14B are the spiral cams formed in the peripheral face of the cam gears 13 and 14, and the inclined plane of these cams 13B and 14B is formed greatly. Drawing 11 is drawing which developed the cylinder-like cam gears 13 and 14 to the plane, and projection 4B formed in the field of the spiral cams 13B and 14B at one at the periphery of a tray 4 contacts. If the cam gears 13 and 14 rotate, as shown in drawing 11 , projection 4B will drive caudad greatly.

[0020] Drawing 12 shows the outline of actuation of the elevator style of the tray 4 by the 1st, 2nd, 3rd, 4th, and 5th cam gear 9, 11, 12, 13, and 14. If the cam gears 9, 11, and 12 synchronize and it rotates, the tray 4 of two or more sheets descends in one, as shown in (A) ->(B) ->(C) ->(D) ->(E) -> (F) of drawing 12 . Between trays 4 carries out sequential straddle by the broad section of Yamabe of the 2nd and 3rd cam gear 11 and 12 in the case of this descent. predetermined disk playback specifies -- having (for example, playback of the 2nd disk being specified from the bottom) -- an elevator style operates, it progresses with drawing 12 (A) -> (B), and actuation of an elevator style stops in the condition which shows in drawing 12 (B). The 4th and 5th cam gear 13 and 14 rotates with a drive in the condition which shows in drawing 12 (B). Since the spiral cams 13B and 14B with whenever [tilt-angle / large] are formed as shown in the 4th and 5th cam gear 13 and 14 at drawing 10 , the 2nd tray 4 drives caudad from under drawing 12 (B), and as shown in drawing 13 , between the 2nd tray and the 3rd trays straddles greatly from the bottom.

[0021] Drawing 16 and drawing 17 show the optical pickup unit which carried the turntable, the optical pickup, etc. In drawing 16 and drawing 17 , 15 is the substrate supported by the base of a case 1 pivotable with the shaft 16, and the optical head chassis 18 is supported through three dampers 17 made of rubber on

this substrate 15. 19 is an optical pickup moved to the optical head chassis 18 by the delivery screw in the direction of arrow-head A. Optical system, such as a light emitting device and a photo detector, is included in this optical pickup 19. 20 is an objective lens which constitutes optical system, and incidence of the reflected light which the laser beam which came out of this objective lens 20 was irradiated by the disk 3, and was reflected by the disk 3 is carried out to a photo detector through an objective lens 20. This photo detector changes and outputs the laser beam which received light to an electrical signal, and the information recorded on the disk 3 from this output signal is reproduced. 21 is the turntable held free [rotation on the optical head chassis 18], and this turntable 21 is directly linked with the revolving shaft of the motor 22 attached in the inferior surface of tongue of the optical head chassis 18. 23 will be two or more pawls held possible [closing motion in the center of a turntable 21], and when the disk 3 is not laid in the turntable 21, if a pawl 23 is in the condition of having closed and a disk is laid in a turntable 21, it drives with a pawl drive, and a pawl 23 will be opened to the method of outside, and will perform maintenance to the turntable 21 of a disk 3. 97 is a piece of bending which comes to bend the periphery section of the optical head chassis 18 caudad, and the slot 98 is formed in this piece 97 of bending. 99 is the sliding plate supported by the substrate 15 free [sliding], and inverse L-shaped piece of lock 99A is formed in this sliding plate 99. Since the optical head chassis 18 is mechanically locked by the substrate 15 when the above-mentioned sliding plate 99 slides and piece of lock 99A engages with the slot 98 of the above-mentioned piece 97 of bending, a damper 17 will be in a non-actuation condition, and will become a suspension lock. Conversely, when the sliding plate 99 slides and engagement into piece of lock 99A and the slot 98 of the piece 97 of bending separates, a suspension lock will be canceled, a damper 17 will be in operating state, and the optical head chassis 18 will be supported by the substrate 15 through a damper 17. At the time of disk playback, it prevents that the vibration from the outside gets across to the optical head chassis 18 by supporting to a substrate 15 by making a damper 17 into operating state. Moreover, in case a disk is transported to a turntable 21 and a disk is clamped on a turntable 21, a turntable 21 is made to clamp a disk certainly by what piece of lock 99A is made to engage with the slot 98 of the piece 97 of bending, and an absorber 17 is made into a non-actuation condition for (it considers as a suspension lock condition).

[0022] In drawing 1 , 24 is the disk extrusion lever held free [sliding] at the point of a shaft 25, and if the disk extrusion lever 24 rotates clockwise (drawing 1) with the drive which makes the motor 30 of drawing 18 a rotation driving source, the tip of the disk extrusion lever 24 will enter between trays 4, and will extrude the disk 3 of one sheet for the peripheral face of the disk 3 on a tray 4 in the direction of a center in a case 1 from push and a tray 4. The disk 3 extruded from the tray 4 is transported to a turntable 21 according to the disk guide device shown in drawing 24 - drawing 28 , it is fixed to a turntable 21 and the rotation drive of it is carried out.

[0023] Drawing 18 , drawing 19 , and drawing 20 show the device driven by the 1st motor 30 in the gestalt 1 of operation. In drawing 18 , drawing 19 , and drawing 20 , 1 is a case and the motor 30 is attached in the side-face plate of this case 1. The rotation driving force of a motor 30 is transmitted to the gearing moderation device (drawing 20) 31, and rotates a gearing 32. Tooth part 33A which

33 is the rotation plate of the shape of radii supported possible [sliding of the base of a case 1], and was formed in the periphery of this rotation plate 33 has geared with the above-mentioned gearing 32. 34 is the gearing supported by the base of a case 1 rotatable with the shaft 35, and this gearing 34 meshes to tooth part 33A of the rotation plate 33. 34A is the cam groove formed in a gearing's 34 top face. 36 is the lever which was attached in the case 1 and supported by the plate (not shown) parallel to the bottom plate of a case 1 rotatable with the shaft 37, and while pin 36A inserted in the above-mentioned gearing's 34 cam-groove 34A is implanted in this lever 36, pin 36B is implanted at the tip of a lever 36. Pin 36B of the above-mentioned lever 36 engages with the below-mentioned disk guide device, and a disk guide device operates with rotation of a lever 36. 38 is the lever supported by the bottom plate of a case 1 rotatable with the shaft 39, and pin 38A is implanted at the tip of this lever 38. 40 is a gearing which was supported by the bottom plate of a case 1 pivotable with the shaft 41, and has been stationed on the top face of the above-mentioned lever 38, and this gearing 40 meshes with the above-mentioned gearing 34. Cam hole 40A is formed in the above-mentioned gearing 40. 38B is the pin implanted in the lever 38, and this pin 38B is inserted in a gearing's 40 cam hole 40A. It engages with the substrate 15 shown in drawing 17 , a substrate 15 drives by rotation actuation of a lever 38, a substrate 15 rotates by making a shaft 16 into the center of rotation, a turntable 21 moves in the direction of a center of a case 1, or pin 38A of the above-mentioned lever 38 moves in the direction of front-board 1A of a case 1.

[0024] 42 is the gearing supported by the bottom plate of a case 1 free [rotation] with the shaft 43, and this gearing 42 meshes to tooth part 33A of the rotation plate 33. The cam hole where 42A was formed in the gearing 42, and 44 are the arms supported by the pin 45 of the bottom plate of a case 1 possible [sliding], and pin 44A which engages with the above-mentioned gearing's 42 cam hole 42A is implanted in this arm 44. An arm 44 engages with the sliding plate 28 shown in ****17 , and with sliding actuation of an arm 44, the suspension of the optical head chassis 18 is locked, or it cancels a lock. That is, the lock of a suspension lock device is canceled, and a suspension lock device is changed into a lock condition, the optical head chassis 18 is fixed to a substrate 15, and it is made the optical head chassis 18 to be supported by the substrate 15 through the absorber 17 as aforementioned, and for an absorber 17 not to work during playback actuation of a disk except playback actuation. When an arm 44 moves in the direction of a center of a case 1, a suspension lock device is locked, and if an arm 44 slides on hard flow, the lock of a suspension lock device will be canceled.

[0025] 46 is the gearing supported by the bottom plate of a case 1 rotatable with the shaft 47, and this gearing 46 meshes to tooth part 33A of the rotation plate 33. 46A is the cam groove formed in a gearing's 46 top face. 48 is the lever which was attached in the case 1 and supported by the plate (not shown) parallel to the bottom plate of a case 1 rotatable with the shaft 49, and while pin 48A inserted in the above-mentioned gearing's 46 cam-groove 46A is implanted in this lever 48, pin 48B is implanted at the tip of a lever 48. Pin 48B of the above-mentioned lever 48 engages with the below-mentioned disk guide device, and a disk guide device operates with rotation of a lever 48.

[0026] 50 is the intermediate gear supported by the bottom plate of a case 1 free [rotation] with the shaft 51, and this intermediate gear 50 meshes with the above-mentioned gearing 46. 52 is the lever supported by the bottom plate of a case

1 free [rotation] with the shaft 53, and while pin 52A is formed in this lever 52, pin 2B is implanted at the tip of a lever 52. 54 is the gearing supported by the bottom plate of a case 1 pivotable with the shaft 55, and this gearing 54 meshes with the above-mentioned intermediate gear 50. 54A is a cam hole where pin 52A of the above-mentioned lever 52 is engaged.

[0027] 56 is the sliding plate supported free [sliding] by the pin 57 implanted in the bottom plate of a case 1, and pin 52B of the above-mentioned lever 52 is engaging with slot 56A formed in the end of this sliding plate 56. The tooth part by which 56B and 56C were formed in the periphery by the side of the edge of the sliding plate 56, and 56D are the tooth parts formed in the inner circumference of the pars intermedia of the sliding plate 56. The above-mentioned tooth parts 56B and 56C have geared with the cam gears 11 and 12 which constitute the elevator style of said tray. 58 is the switch drive plate supported by the bottom plate of a case 1 free [rotation] with the shaft 59, and this switch drive plate 58 is driven by the end of the rotation plate 33, and switches on and turns off a switch 60. 61 is the switch drive plate supported for the bottom plate of a case 1, enabling free sliding, and this switch drive plate 61 is driven by the other end of the rotation plate 33, and switches on and turns off a switch 62.

[0028] Next, actuation of the device shown in drawing 20 from drawing 18 is explained. The condition which shows in drawing 18 is in the condition which the rotation plate 33 rotated to counterclockwise termination, and this condition is in the condition which inserts or discharges a disk from disk insertion opening of front-board 1A of a case 1. In the condition which shows in drawing 18 , if a motor 30 begins rotation, the rotation driving force of a motor 30 will be told to a gearing 32 through the gearing moderation device 31. For this reason, the rotation plate 33 which gears with this gearing 32 rotates clockwise.

[0029] Drawing 21 shows the operating state of each part at the time of the rotation plate 33 rotating clockwise from the condition which shows in drawing 18 . T0 to T11 of drawing 21 shows the predetermined rotation include angle of the rotation plate 33 at the time of making into an include angle 0 the condition which shows in drawing 18 . The section of T0-T2 of drawing 21 is the section of loading of a disk, and unloading, and T2-T11 are the sections to disk playback actuation initiation. If a motor 30 starts rotation by T0, the rotation plate 33 will begin rotation clockwise. The gearing 46 which meshes to the rotation plate 33 rotates with rotation of the rotation plate 33, the intermediate gear 50 which meshes with a gearing 46 rotates, and the gearing 54 which meshes with an intermediate gear 50 further rotates. In T0 of drawing 21 , the roller 82 supported by the lever 80 free [rotation] as shown in drawing 29 is contained in a gearing's 54 slot 54A. If the rotation plate 33 rotates one or more [angle-of-rotation T] as shown in drawing 21 , a roller 82 will come out of a gearing's 54 slot 54A, and will close disk insertion opening.

[0030] The angle of rotation T2 of drawing 21 is a standby location, and if disk playback is directed in this standby location T2, a motor 30 will begin rotation. If a motor 30 begins to rotate, the disk extrusion lever 24 will drive, the disk 3 on a tray 4 is pushed, and it is pushed in the direction of a core of a case 1. If the gearing 54 which it drives by the motor 30, and the rotation plate 33 rotates clockwise (drawing 18), and rotates with rotation of this rotation plate 33 does predetermined include-angle rotation, pin 52A of the lever 52 which engages with a gearing's 54 cam hole 54A will drive, and a lever 52 will begin rotation (include-

angle T four of drawing 21). If a lever 52 rotates, the sliding plate 56 connected with pin 52B at the tip of a lever 52 will slide, and the cam gears 11 and 12 which mesh to the tooth parts 56B and 56C of this sliding plate 56 will rotate (include-angle T four of drawing 21). The predetermined tray 4 is caudad pressed by rotation of the cam gears 11 and 12 by the cam gears 11 and 12, and as shown in drawing 15 , between trays 4 opens. Moreover, the gearing 63 which meshes to tooth part 56D of the sliding plate 56 rotates with sliding actuation of the sliding plate 56 (T-four-T6 of drawing 21), pin 64A of the disk regulation object 64 which engages with this gearing's 63 cam-groove 63A drives, the disk regulation object 64 descends, and spacing with the disk regulation objects 64 and 65 becomes large.

[0031] Since the gearing 34 meshes to tooth part 33A of the rotation plate 33, a gearing 34 also rotates with rotation of the rotation plate 33. Since the gearing 40 meshes on the gearing 34, a gearing 40 rotates with rotation of the rotation plate 33. If rotation of the rotation plate 33 exceeds an include angle T6, pin 38A of the lever 38 inserted in a gearing's 40 cam hole 40A will drive, and a lever 38 will rotate. Since pin 38A of a lever 38 is stopped by the substrate 15 holding the optical head chassis 18, the substrate 15 supported by the bottom plate of a case 1 rotatable with the shaft 16 rotates counterclockwise centering on a shaft 16, and the turntable 21 prepared in the optical head chassis 18 is moved in the direction of a center of a case 1.

[0032] Since gearings 34 and 46 mesh to tooth part 33A of the rotation plate 33, gearings 34 and 46 also rotate with rotation of the rotation plate 33. Pin 36A of a lever 36 and pin 48B of a lever 48 are engaging with gearings' 34 and 46 cam grooves 34A and 46A, respectively, and levers 36 and 48 rotate with rotation of gearings 34 and 46 to them. Pin 36B of a lever 36 engages with the cam plate 71 of the 1st disk guide device, and pin 48B of a lever 48 is engaging with the cam plate 77 of the 2nd disk guide device 74. For this reason, if gearings 34 and 46 rotate with rotation of the rotation plate 33 Levers 36 and 48 rotate and the cam plates 71 and 77 of the 1st and 2nd disk guide device drive. The pieces 69 and 70 of disk maintenance and the pieces 75 and 76 of disk maintenance Drawing 27 (A), (B), (C), (D), Move up and down, as shown in drawing 28 (A), (B), (C), and (D), and a disk 3 is pinched by the pieces 69 and 70 of disk maintenance, and the pieces 75 and 76 of disk maintenance. After it transports even a turntable 21 and a disk 3 is clamped by the turntable 21, between the piece 69 of disk maintenance and 70 and between the piece 75 of disk maintenance and 76 open greatly.

[0033] Since the gearing 42 meshes to tooth part 33A of the rotation plate 33, a gearing 42 also rotates with rotation of the rotation plate 33. Since pin 44A of the arm 44 which can slide freely is engaging with a gearing's 42 cam hole 42A, if the rotation include angle of the rotation plate 33 exceeds an include angle T10, an arm 44 will drive by rotation of a gearing 42, and an arm 44 slides in the direction close to front-board 1A of a case 1. If the optical head chassis lock device is engaging with the arm 44 and an arm 44 slides in the direction of front-board 1A, the lock of an optical head chassis lock device will be canceled, and the optical head chassis 18 will be supported by the substrate 15 through a tamper 17. If the rotation plate 33 rotates further clockwise, the switch drive plate 61 will drive by the tip of the rotation plate 33, a switch 62 will turn on, and rotation of the rotation plate 33 will stop.

[0034] Drawing 22 shows the gearing 63 supported by the bottom plate of a case 1 pivotable in drawing 18 and drawing 19 . This gearing 63 meshes to the tooth part

56 of the sliding plate 56. Slot 63A is formed in this gearing's 63 peripheral face. Drawing 23 shows the cylinder-like disk regulation object 64. Pin 64A is formed in the inner skin of this disk regulation object 64. 64B is a protruding piece for nitings. The gearing 63 which shows drawing 22 is inserted into the above-mentioned disk regulation object 64, and pin 64A of the inside of the disk regulation object 64 is inserted in a gearing's 63 slot 63A. Since protruding piece 64B of the disk regulation object 64 is inserted in the hole of the bottom plate of a case 1, if a gearing 63 rotates, the disk regulation object 64 will move up and down in drawing 23. In drawing 23, 65 is the disk regulation object attached in the top-face plate 66 of a case 1, and if the above-mentioned disk regulation object 64 moves up and down, it will change spacing with the disk regulation objects 64 and 65. The arrangement part in the case 1 of the disk regulation objects 64 and 65 is a part which can insert feed-hole 3A of the disk 3 contained by the tray 4. As shown in drawing 23, the disk 3 which had between the disk regulation objects 64 and 65 chosen passes, in case the selected disk 3 is transported in the turntable 21 direction, spacing between the disk regulation object 64 and 65 becomes narrow, and since feed-hole 3A of other disks 3 laid in the tray 4 is inserted in the disk regulation objects 64 and 65, it is prevented that other disks elutriate in the direction of a turntable. In case the selected disk is held at a turntable 21 and playback of a disk is performed, spacing of the disk regulation objects 64 and 65 becomes large, and the disk 3 by which the rotation drive was carried out on the turntable 21 rotates between the disk regulation object 64 with which spacing became large, and 65.

[0035] Drawing 24, drawing 25, and drawing 26 show the 1st disk guide device shown in drawing 20 by 67. In drawing 24, drawing 25, and drawing 26, 68 is the support substrate fixed to the top-face plate of a case 1, and one slot 68C of two slots 68A and 68B of a lengthwise direction and longitudinal directions is formed in this support substrate 68. 69 is the piece of disk maintenance supported by slot 68A of the above-mentioned support substrate 68 free [vertical sliding], and two pins 69A and 69B implanted in this piece 69 of disk maintenance are inserted in the above-mentioned slot 68A. 70 is the piece of disk maintenance supported by slot 68B of the above-mentioned support substrate 68 free [vertical sliding], and two pins 70A and 70B implanted in this piece 70 of disk maintenance are inserted in the above-mentioned slot 68B. 71 is the cam plate supported for the longitudinal direction by the above-mentioned support substrate 68, enabling free sliding, and cam grooves 71A and 71B are formed in this cam plate 71. The above-mentioned cam plate 71 is supported for the field of another side of the support substrate 68 to the above-mentioned pieces 69 and 70 of disk maintenance being supported for the field of one of the two of the support substrate 68, enabling free vertical sliding, enabling free right-and-left sliding. Pin 70B which pin 69A implanted in the above-mentioned piece 69 of disk maintenance was inserted in cam-groove 71A, and was implanted in the piece 70 of disk maintenance is inserted in cam-groove 71B. 72 is the pin implanted in the cam plate 71, this pin 72 is inserted in slot 68C of the support substrate 68, and the cam plate 71 is guided at slot 68C, and it slides on it horizontally to the support substrate 68. 73 is the piece of bending formed in the lower part of the cam plate 71 at one, and long slot 73A is formed in this piece 73 of bending. Pin 36B implanted in the above-mentioned lever 36 shown in drawing 18 and drawing 19 is inserted in long slot 73A of the piece 73 of bending. If a lever 36 rotates, the cam plate 71 will slide on the support

substrate 68 top in a longitudinal direction by pin 36B of this lever 36. If the cam plate 71 slides on a longitudinal direction, since Pins 69A and 70B will drive by the cam grooves 71A and 71B of this cam plate 71, the pieces 69 and 70 of disk maintenance supported by the support substrate 68 free [vertical sliding] slide up and down.

[0036] (A) of drawing 27 , (B), (C), and (D) show the side face of the above-mentioned disk guide device. If the cam plate 71 drives by pin 36B of a lever 36 and the cam plate 71 slides rightward [of drawing 24], the pieces 69 and 70 of disk maintenance will slide up and down, and spacing between the piece 69 of disk maintenance and 70 will change with (A) ->(B) ->(C) -> (D) of drawing 27 . (A) of drawing 27 is timing by which between the piece 69 of disk maintenance and 70 is transported to the disk 3 extruded from the tray 4, and spacing between the piece 69 of disk maintenance and 70 is large slightly from the thickness of a disk 3. Drawing 27 (B) shows the condition of horizontal migration of a disk 3 finishing and pinching the disk 3 by the pieces 69 and 70 of disk maintenance, and while the pieces 69 and 70 of disk maintenance had pinched the disk 3 in this condition, it descends. It is the timing to which a disk 3 descends to the location of a turntable 21, and drawing 27 (C) clamps a disk 3 on a turntable 21 with a pawl 23, and spacing between the piece 69 of disk maintenance and 70 becomes somewhat large to this timing. Drawing 27 (D) is timing which a disk clamp is completed, is made to rotate a turntable 21, and performs disk playback, and since the piece 69 of disk maintenance goes up at the time of disk playback and the piece 70 of disk maintenance descends, spacing between the piece 69 of disk maintenance and 70 becomes the largest. In drawing 20 , 74 is the 2nd disk guide device, and according to the 1st disk guide device shown in drawing 26 from drawing 24 , and the same device, this 2nd disk guide device moves the pieces 75 and 76 of disk maintenance up and down, as shown in drawing 28 (A), (B), (C), and (D) synchronizing with the 1st disk guide device. In drawing 28 (A), (B), (C), and (D), 77 is a cam plate equivalent to the cam plate 71 of the 1st disk guide device 67, and pin 48B of the lever 48 shown in drawing 18 and drawing 19 is inserted in long slot 78A of the piece 78 of bending of this cam plate 77. In drawing 18 , if the rotation plate 33 rotates clockwise, the gearing 46 which meshes to tooth part 33A of this rotation plate 33 rotates, the pin A of the lever 48 which engages with this gearing's 46 cam-groove 46A will drive, and a lever 48 will rotate centering on a shaft 49. For this reason, the cam plate 77 drives by pin 48B of a lever 48, the cam plate 77 slides on a longitudinal direction, and the pieces 75 and 76 of disk maintenance move up and down with this cam plate 77.

[0037] Drawing 29 shows a part of device for opening and closing disk insertion opening formed in front-board 1A of a case 1. In drawing 29 , the protruding piece with which 79 comes to bend a part of bottom plate of a case 1, and 80 are the levers supported by the protruding piece 79 rotatable with the shaft 81, and the roller 82 is supported by the lower part of this lever 80 pivotable. 54A is the slot formed in the periphery section of a gearing's 54 top face, and if a gearing 54 rotates, a roller 82 will go into this slot 54A, or it will come out of it. If it goes into roller 82 fang-furrow 54A, the upper limit of a lever 80 will fall caudad, and if it comes out of roller 82 fang-furrow 54A, the upper limit of a lever 80 will go up up. Disk insertion opening is opened and closed by vertical movement of the upper limit of a lever 80, when it goes into roller 82 fang-furrow 54A, disk insertion opening opens, and insertion and discharge of a disk are

attained from disk insertion opening. On the other hand, when it comes out of roller 82 fang-furrow 54A, disk insertion opening closes, and insertion of a disk and discharge become impossible. In the section of T0-T2 of drawing 21 , if a gearing 54 rotates with rotation of the rotation plate 33, since it comes out of slot 54A out of roller 82 fang-furrow 54A, a lever 80 will go up, disk insertion opening will open, and insertion of a disk will be attained. Here, if a disk is inserted in disk insertion opening, since disk insertion will be detected, the motor for disk migration (not shown) will rotate and the rotation drive of the roller 2 will be carried out by the photosensor, a disk 3 is transported into a case 1.

[0038] With the gestalt 1 of operation, as mentioned above, with the rotation driving force of a motor 30 In the process in which the rotation plate 33 will be in the condition which it rotates clockwise and shows drawing 19 from the condition which shows in drawing 18 Disk insertion opening is closed and between trays 4 straddles greatly by rotation of the 4th and 5th cam gear 13 and 14. An optical head unit rotates centering on a shaft 16 by rotation of a lever 38, and a turntable 21 is moved between the trays 4 which straddled greatly. Even a turntable 21 drops a disk, driving the 1st and 2nd disk guide device 67 and 74 by rotation of levers 36 and 48, and pinching a disk 3. After a disk 3 is clamped by the turntable 21, between the piece 75 of disk maintenance and 76 is greatly opened between the piece 69 of disk maintenance, and 70. Then, the suspension lock of the optical head chassis 18 is canceled by actuation of an arm 44, and it will be in the disk playback condition shown in drawing 19 .

[0039] Drawing 30 shows the disk retrieval device in the gestalt 2 of operation. In drawing 30 , 83 is the disk extrusion lever supported by the case 1 rotatable with the shaft 84, end 83A of this disk extrusion lever 83 is a disk mechanical component which drives the peripheral face of a disk 3, and projection 83B is formed in the other end of the disk extrusion lever 83. If the above-mentioned projection 83B drives by the cam mechanism which gears in the gearing moderation device of the motor 30 shown in drawing 18 , the peripheral face of the disk 3 laid in the tray 4 will be pushed by disk mechanical-component 83A, and a disk will be extruded from a tray. The lever with which 85 was supported by the case 1 rotatable with the shaft 86, the spring with which 87 energizes the above-mentioned lever 85 clockwise, the projection to which 88 was formed in the lever 85 at one, and 89 are the photo couplers attached in the top-face plate of a case 1, and opposite arrangement of the light emitting device of this photo coupler 89 and the photo detector is carried out on both sides of the above-mentioned projection 88. If a disk 3 is extruded by disk mechanical-component 83A of the disk extrusion lever 83 as aforementioned, a lever 85 will rotate counterclockwise (drawing 30) with the extruded disk 3. In order that projection 88 may move from between the light emitting device of a photo coupler 89, and a photo detector as a result of the rotation of the projection 88 formed in the lever 85 of rotation of a lever 85 at one, a photo coupler 89 switches from OFF to ON. Thus, the existence of the disk on a tray is detected by detecting whether the lever 85 rotated with a photo coupler 89 by pushing the disk on a tray by the disk extrusion lever 83. When the power source of the disk changer equipment of the gestalt 1 of operation is turned on, the existence of the disk 3 on each tray 4 is detected by going up or dropping a tray 4 by the elevator style shown in drawing 6 , inserting the disk extrusion lever 83 between trays 4 one by one synchronizing with this elevator style, and

detecting whether a lever 85 rotates in this case.

[0040]

[Effect of the Invention] According to invention of this invention according to claim 1, the timing of each actuation becomes fixed and disk drawing actuation, rotation actuation of a turntable support means, and guide actuation of a disk can be ensured. According to invention of this invention according to claim 2, a tray straddle means becomes easy. According to invention of this invention according to claim 3, disk changer equipment can be miniaturized. According to invention of this invention according to claim 4, at the time of disk playback, an absorber can remove the effect by extraneous vibration, and stationing of a turntable becomes exact except the time of disk playback. Since migration of disks other than the disk played is regulated according to invention of this invention according to claim 5, playback actuation becomes certain. According to invention of this invention according to claim 6, the device which opens and closes disk insertion opening becomes easy. According to invention of this invention according to claim 7, since a disk regulation means can be operated with a rotation means, the drive of a disk regulation means becomes easy. According to invention of this invention according to claim 8, the configuration of a disk regulation means becomes easy. According to invention of this invention according to claim 9, the configuration of the elevator means of a tray becomes easy. According to invention of this invention according to claim 10, the elevator style to which a tray is moved becomes easy. According to invention of this invention according to claim 11, the existence of the disk on a tray is easily detectable. According to invention of this invention according to claim 12, a turntable support means can be inserted between the trays which straddled, and disk playback can be performed. According to invention of this invention according to claim 13, the disk guide device in which a disk is guided becomes easy.

[Translation done.]

* NOTICES *

1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. **** shows the word which can not be translated.
3. In the drawings, any words are not translated.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] The plan of the disk changer equipment in the gestalt 1 of operation of this invention
[Drawing 2] The plan at the time of playback actuation of the gestalt 1 of this operation
[Drawing 3] The side elevation of the tray device section of the gestalt 1 of this operation
[Drawing 4] The side elevation of the tray device section at the time of playback of the gestalt 1 of this operation
[Drawing 5] The side elevation of the tray device section at the time of playback of the gestalt 1 of this operation
[Drawing 6] The plan of the elevator style of the gestalt 1 of this operation
[Drawing 7] The side elevation of the cam gear of the gestalt 1 of this operation
[Drawing 8] The side elevation of the cam gear of the gestalt 1 of this operation
[Drawing 9] The explanatory view of the cam gear of the gestalt 1 of this operation of operation
[Drawing 10] The side elevation of other cam gears of the gestalt 1 of this operation
[Drawing 11] The explanatory view of other cam gears of the gestalt 1 of this operation of operation
[Drawing 12] Drawing showing the outline of actuation of the elevator style of the gestalt 1 of this operation
[Drawing 13] Drawing showing the outline of the elevator style at the time of disk playback of the gestalt 1 of this operation
[Drawing 14] The side elevation of the elevator style of the gestalt 1 of this operation
[Drawing 15] The side elevation of the elevator style at the time of disk playback of the gestalt 1 of this operation
[Drawing 16] The plan of the optical head chassis of the gestalt 1 of this operation
[Drawing 17] The side elevation of the optical head chassis of the gestalt 1 of this operation
[Drawing 18] The plan of the drive of the gestalt 1 of this operation
[Drawing 19] The plan of the drive of the gestalt 1 of this operation
[Drawing 20] Some plans of the drive of the gestalt 1 of this operation
[Drawing 21] Drawing showing the timing of the drive of the gestalt 1 of this operation of operation

[Drawing 22] The side elevation of the gearing of the gestalt 1 of this operation
[Drawing 23] The side elevation of the disk regulation device of the gestalt 1 of this operation
[Drawing 24] The front view of the disk guide device of the gestalt 1 of this operation
[Drawing 25] The front view of the disk guide device of the gestalt 1 of this operation
[Drawing 26] The front view of the disk guide device of the gestalt 1 of this operation
[Drawing 27] The side elevation of the piece of disk maintenance of the gestalt 1 of this operation
[Drawing 28] The side elevation of other pieces of disk maintenance of the gestalt 1 of this operation
[Drawing 29] Some side elevations of the breaker style of disk insertion opening of the gestalt 1 of this operation
[Drawing 30] The plan of the disk existence detection device of the gestalt of other operations
[Drawing 31] The plan showing the outline of conventional disk changer equipment
[Description of Notations]
1 Case
2 Roller
3 Disk
4 Tray
5 Metal Plate
6 Lever
7 Roller
8 Coil Spring
9 1st Cam Gear
10 Protruding Piece
11 2nd Cam Gear
12 3rd Cam Gear
13 4th Cam Gear
14 5th Cam Gear
15 Substrate
16 Shaft
17 Damper
18 Optical Head Chassis
19 Optical Pickup
20 Objective Lens
21 Turntable
22 Motor
23 Pawl
24 Disk Extrusion Lever
25 Shaft

[Translation done.]